Waste Treatment Lagoon (359)

Items which must be adhered to.

- Lagoon must be constructed, operated, and maintained without polluting air or water resources.

Laws
- IDEM approval required for facilities meeting the size requirements or causing a pollution violation.

Location
- Waste treatment lagoons must not be constructed in the 100-year floodway unless permitted by the Indiana Department of Natural Resources, Division of Water.

- Access to all manure management systems shall be constructed two (2) feet above the 100-year flood elevation.

- The lagoon must be located to allow for access and maintenance.

- Lagoons shall not be constructed on slopes greater than 12%.

- Shall not be located in karst terrain or over mines without a detailed geologic exploration and specific design considerations for these sites.

- Setback distances, Table 1.

Soil & Foundation
- Document location of water table along with soils information.

- If a compacted soil liner is used, it must have a maximum specific discharge of 1/16 $in^3/in^2/day$ (1.8 x 10^{-6} $cm^3/cm^2/sec$). Clay liners shall be a minimum of one (1) foot thick.

- If in-situ soils meet the maximum specific discharge criteria, the existing soils shall be over-excavated a minimum of six (6) inches and recompacted.

- The water table must be at least two (2) feet below the bottom of the lagoon or provisions made to lower the water table below the lagoon. IDEM requires an access point for sampling with any drainage system.

- IDEM requires a minimum separation distance of two (2) feet between bedrock and the lagoon bottom.

Waste Loading
- Daily waste loading shall be based on the maximum daily loading considering all waste sources that will be treated by the lagoon.

Treatment Period
- Shall be the greater of either 60 days or the time required to provide the storage that allows environmentally safe utilization of waste considering the climate, crops, soil, and equipment requirements.

Required Volume
- Lagoon volume requirements.

- Use average weight and maximum number of animals to size lagoon.

- Five (5) years of sludge accumulation should be included in the design.

- A minimum of two (2) feet of freeboard is required.

Embankments

- Minimum top widths, Table 2.

- The side slopes shall not be steeper than 2.5 horizontal to 1 vertical.

- The embankment shall be overbuilt by five-percent (5%).

- A cutoff of impermeable soil shall be provided at or just upstream of the embankment centerline unless a liner is used. The cutoff trench shall have a minimum depth of two (2) feet (after stripping), a minimum bottom width of eight (8) feet, and side slopes not steeper than 1.5:1.

Inlet

- Inlet pipes shall meet the requirements of Manure Transfer (634).

- Inlets from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices to control gas entry into the buildings or other confined spaces.

Outlet

- The lagoon shall have no outlets than can automatically release effluent from the storage portion of the lagoon, except an outlet, which releases into another lagoon stage or storage pond.

- Outlet pipes shall meet the requirements of Manure Transfer (634).

- Anti-seep collars shall be provided around all pipes.

- An emergency spillway shall be provided for storage structures where the contributing drainage area exceeds 50% of the surface area of the storage structure. The emergency spillway shall be designed for the 50-year, 24-hour storm event. The top of the berm shall be a minimum of one (1) foot above the crest of the emergency spillway.

- The emergency spillway flow shall be directed to a secondary containment area, infiltration area, or other appropriate manure storage structure.

Operating Levels

- A staff gauge or marker shall be installed to identify the maximum operating level and the maximum drawdown level (minimum treatment volume).

- Minimum depth for anaerobic lagoons is six (6) feet.

- Minimum depth for aerobic lagoons is two (2) feet and the maximum depth is five (5) feet.

Emptying Facilities

- Facilities should be provided for drawdown of the lagoon.

- Ramps for vehicle access shall have a slope of 10 horizontal to 1 vertical or flatter, unless special traction surfaces are provided or the ramp will only be used as an access point for pumping equipment.

Sludge Removal

- Provisions should be made for periodic removal of accumulated sludge.

Erosion Protection

- Areas disturbed by construction must be treated to control erosion and revegetated.

Safety

- Lagoons must be fenced and warning signs posted.

O&M

- O&M plan must be provided. It must include information to keep the lagoon structurally and environmentally sound. Emergency action procedures should be contained in the plan and prominently displayed.

- The O&M plan should address the removal and disposal of sludge.

Items which are at the discretion of the designer.

- Site selection should consider proximity to the source of waste and polluted runoff, surface and ground water, access to other facilities, loading and unloading, health regulations, foundation, prevailing winds, expansion and compatibility with the surrounding landscape.

- Lagoons may be designed for odor control by cutting the loading rate by 50%.

- Non-polluted runoff should be excluded from the lagoon.

- For lagoons requiring approval from IDEM, the minimum storage period shall be 180 days.

- All lagoons requiring IDEM approval must have a professional engineer's certification of the plans and specifications.

- Solids can be removed from the waste before it enters the lagoon.

- The lagoon should be located to minimize the impact of odors and to minimize the impact on visual resources.

- Inside slopes should be flattened to ease compaction on the side slopes.

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